



Project Information Document (PID)

Concept Stage | Date Prepared/Updated: 11-May-2019 | Report No: PIDC25793

**BASIC INFORMATION****A. Basic Project Data**

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| Country Burundi | Project ID P164435 | Parent Project ID (if any) | Project Name Burundi Access to Sustainable Energy (P164435) |
| Region AFRICA | Estimated Appraisal Date Nov 25, 2019 | Estimated Board Date Dec 12, 2019 | Practice Area (Lead) Energy & Extractives |
| Financing Instrument Investment Project Financing | Borrower(s) Ministère des Finances | Implementing Agency Ministère de l'Hydraulique, de l'Energie et des Mines (MHEM), Agence Burundaise d'Electrification Rurale (ABER) | |

Proposed Development Objective(s)

Expand access to energy services for Burundian households, businesses and public institutions in rural areas.

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

| | |
|---------------------------|-------|
| Total Project Cost | 50.00 |
| Total Financing | 50.00 |
| of which IBRD/IDA | 50.00 |
| Financing Gap | 0.00 |

DETAILS**World Bank Group Financing**

| | |
|---|-------|
| International Development Association (IDA) | 50.00 |
| IDA Grant | 50.00 |

Environmental and Social Risk Classification

Concept Review Decision



Substantial

Track II-The review did authorize the preparation to continue

Other Decision (as needed)

B. Introduction and Context

Country Context

- Burundi is a small, landlocked country in eastern central Africa with a total land area of 27,834 km² and approximately 10.5 million inhabitants, making it the third most densely populated country in the continental Sub-Saharan Africa.** With its extremely low urbanization level (12 percent), Burundi has the most densely populated rural areas in the world. The high population growth rates (expected to double by 2040) and high population density (423 people per km² in 2017) generate pressure on land and natural resources.¹ Burundi's population is very young. About 58 percent of the population is below 19 years old. Economic growth is largely dependent on agriculture, accounting for about 32 percent of the Gross Domestic Product (GDP) and 90 percent of livelihoods. This dependence, however, can lead to extreme vulnerability to climatic and external shocks. Although agriculture is the backbone of the economy, many Burundians face hunger, malnutrition, and stunted development.
- The years of conflict have placed significant strain on Burundi's economy and population.** Tension between the country's two main ethnic groups – exacerbated by land scarcity issues – erupted in a civil war in 1993, which ended in 2006. The impact on the economy and human lives was devastating (“mass poverty”). Burundi showed initial signs of economic recovery from 2010 to 2014 when GDP grew by an average of 4.2 percent per year. The renewed outbreak of political disturbance in April 2015 resulted in economic contraction, with a negative GDP growth of 3.9 percent in 2015 and 0.6 percent in 2016.² However, 2017 again showed signs of recovery as annual GDP growth was positive, at 0.5 percent. This pick up was supported by rebounds in coffee production and other industries, as chronic power shortages were reduced. World Bank projections also show positive real GDP growth rates, up to an estimated 2.5 percent in 2020.³ Security has improved since 2015 but remains fragile.
- Burundi is a fragile and conflict-affected country with considerable development challenges.** Despite strong efforts and improvement in key health and education indicators, Burundi ranks 165th out of 189 countries on the 2018 Statistical Update of the Human Development Index. After more than 10 years of open conflict, almost three years of economic embargo, and a four-year post-war emergency period, Burundi has one of the lowest per capita Gross National Income (GNIs) in the world (US\$280 in 2016). According to the Poverty Assessment of 2016 and the most recent national household survey (*Enquête sur*

¹ Food and Agriculture Organization and World Bank population estimates. <https://data.worldbank.org/indicator/EN.POP.DNST>

² The political unrest and violence that erupted in April 2015 was in the wake of the contested reelection of the incumbent President for a third term in office in open violation of the Arusha accords

³ World Bank Group, Burundi Interim Economic Update, August 2018. Macroeconomics, Trade and Investment Global Practice.



les Conditions de Vie des Ménages Burundais, ECVMB, 2017)⁴ around 65 percent of the Burundian population is classified as poor (living under the national poverty line of US\$2 a day) and over 70 percent lives on less than US\$1.90 per capita and per day.

4. **Electricity deficiency is one of the principal barriers to social and economic development in Burundi.** Not more than 7.6 percent of the population of Burundi has access to electricity⁵—one of the lowest in the world. According to the ECVMB 2017, the electricity rate in rural Burundi is as little as 1.8 percent⁶, which makes it impossible to provide key social services such as education and health to the population. A 2014 World Bank Enterprise Survey, the latest so far, found that 22 percent of Burundian firms identified poor electricity access and reliability as major barriers to investment, compared to an average 15 percent across Sub Saharan Africa.⁷ Fewer power shortages took place in 2017, thanks to the extra 30MW of backup generation, but inadequate power supply continues to limit industrial activity. The 2016 Regulatory Indicators for Sustainable Energy (RISE), a World Bank index that “assesses countries’ policy and regulatory support for each of the three pillars of sustainable energy (access to modern energy, energy efficiency, and renewable energy),” places Burundi in a red zone in terms of grid electrification—indicating that the country is in the bottom third in their policy and regulatory environment^{8,9} Poor coverage and low-quality infrastructure create time and money costs – that lowers the return on capital and labor, discourage investment, and constrain economic growth.
5. **The Government of Burundi is committed to supporting the economic and social development of the country, as outlined in the “National Development Plan 2018-2027” (*Plan National de Développement, PND*), where energy deficit is outlined as one of the main constraints to economic growth.** The Government of Burundi (GoB) identified three strategic objectives, the first of which being to ensure “sustainable and inclusive growth for economic resilience and sustainable development”. Under this objective, the second strategic pillar focuses on appropriate infrastructure to support energy production and promotes alternative sources of energy. At the heart of the PND is a focus on rural areas, where more than 9 million people live, and for which the Government wishes to allocate 60 percent of all resources of the Plan over the next 10 years.

Sectoral and Institutional Context

6. **Governed by the Electricity Law of 2015, the electricity sector in Burundi is largely vertically integrated** with a single, fully publicly owned utility that manages all levels of the electricity supply chain: generation, transmission and distribution. The sector currently operates under a single-buyer model, with independent power producers that inject supply to the main utility. Rural electricity service provision by isolated

⁴ ECVMB, *Enquête sur les Conditions de Vie des Ménages Burundais* (2017).

⁵ Global Tracking Framework, 2016.

⁶ 5 percent in the Country Partnership Framework (CPF) for the Republic of Burundi For the Period of FY18-FY22 (Draft for Discussion). The World Bank (2018) versus 7 percent in the Burundi 2016 RISE country data versus 7.5 percent in the Subjective Poverty and recent Changes in Living Conditions: Findings from the Rapid Household Survey (ECVMB 2017), World Bank, June 2018.

⁷ Enterprise Surveys (<http://www.enterprisesurveys.org>). The World Bank. Burundi (2014).

⁸ According to Burundi 2016 Regulatory Indicators for Sustainable Energy (RISE)s country data.

⁹ <http://www.worldbank.org/en/topic/energy/publication/rise---regulatory-indicators-for-sustainable-energy>



networks is managed by a rural electrification agency which owns and operates the infrastructure. The Electricity Law is not comprehensive and requires further augmentation; for example, there is currently no specific legal framework for the development of renewable energy. Nevertheless, the Law presents a broad public-private partnership framework and allows for various electricity production regimes¹⁰, competition in generation, and light-handed regulation for small power projects.

7. The key institutional sector stakeholders are:

The Ministry of Hydraulic, Energy and Mines (MHEM). The MHEM is responsible for developing and implementing the energy sector policies, administering sector planning, and supervising state electricity and mining state enterprises. Its mandate also includes development of an energy supply program to ensure sustainable access of the population to modern energy sources; promotion of renewable energies through adequate research and dissemination actions; participation in exchange and partnership programs with regional and international institutions, of which Burundi is a member; and planning, construction and management of basic water, energy and sanitation infrastructure projects.

L'Agence Burundaise de l'Électrification Rurale (ABER). ABER is an agency responsible for the development and implementation of rural electrification programs and projects. It owns and manages mini-grids (from hydro, solar and wind energy), and other forms of rural electrification. ABER was founded in 2012 and approved by the Ministerial decree N530/777 in 2013. ABER operates under the responsibility of MHEM, as a “personalized administration” of the State.

La Régie de Production et de Distribution de l'Eau et de l'Électricité (REGIDESO). REGIDESO is a state-owned national electricity and water production and distribution company created in 1962 on the independence of the country. REGIDESO is vertically-integrated and the main producer and supplier of electricity in Burundi, serving about 76,000 customers. REGIDESO has a monopoly on electricity supply, transmission, and distribution in urban and rural areas; this monopoly was renewed in 2015 for 25 years.¹¹

L'Autorité de Régulation des Secteurs de l'Eau Potable et de l'Energie (AREEN). AREEN is the regulatory agency for the electricity and water sector in Burundi (established in 2014 and reorganized in 2018). AREEN's principal mission is to ensure the transparent and profitable development of Burundi's water and electricity sector; control, regulation and monitoring of related activities to enforce the execution of contractual provisions, regulations, and specifications by sector operators; and the implementation, monitoring and enforcement of rates in accordance with the set pricing principles.

8. The country has excellent, but largely untapped renewable energy potential, including solar, biomass and wind.

The average solar installation in Burundi is similar to that of Southern Europe with around 4-5kWh/m²/day in the Eastern part of the country and 3.3-4.0kWh/m²/day at high altitudes in the Western part of the country (or 2000 kWh/m².year on average). As for wind energy, there are few sites suitable for wind power generation in Burundi, but some locations such as the shores of Lake Tanganyika (wind speed is

¹⁰ Electricity Law of 2015 provides for various production regimes and supply for auto-consumption, including (1) public concessions for hydro plants (2) projects operating on public lands which require contracts with the state or parastatal entity (3) projects greater than 500kW on private land that require authorization from the Ministry of Energy and (4) power projects less than 500kW that must simply be declared.

¹¹ The Electricity Law dated 23 April 2015 grants to Regideso the monopoly of transmission, distribution and supply of the electricity for 25 years from the entry into force of the Electricity Law. However, direct selling to private third-party may be authorised under specific conditions, see Section 4 (b).



4 to 5 m/s) could prove to have favorable conditions for the exploitation of such energy. Data on wind patterns has been recorded by the Institute for Agronomic Sciences of Burundi (ISABU), primarily for agricultural purposes, giving a mean wind speed between 4 and 6 m/s. To-date, no feasibility studies on wind power have been carried out in Burundi. There are also several available sources of waste biomass and agricultural residue in different forms in Burundi, which can be sustainably harvested and transformed into energy sources.

9. **The power generation sources are largely hydropower and diesel.** Total capacity is 58 MW and the Electricity is supplied by the following sources: (i) 35.5 MW generated from power plants in Burundi (of which 86 percent comes from hydropower generation and the rest from diesel); (ii) 3.5 MW are purchased from the DRC (Ruzizi I); and (iii) 12 MW are purchased from the regional hydropower plant Ruzizi II (a partnership between the governments of Burundi, DRC, and Rwanda; located along the DRC/Rwanda border). The existing hydropower stations have an availability factor of only 30 percent, which is significantly lower than that of a normal hydropower station, estimated around 80 – 90 percent. This is primarily due to deteriorating equipment and seasonal fluctuations in availability of water resources. The high reliance on hydropower makes the electricity supply vulnerable to seasonal droughts.
10. **Burundi's power generation sector has been opened to competition since 2015, although with limited results so far in mobilizing private sector investments.** The change is still recent, but the political unrest in 2015 also worked as a detractor of investments. Burundi has some experience with privately-financed projects in the energy sector, including various small hydro plants, but the enabling environment for investments is still feeble. Nonetheless, due to the large investment needs and limited investment capacity within the country's utility, the GoB is looking to increase private sector participation to address the power sector needs. So far, Independent Power Producer (IPP) projects have been awarded on a sole sourced basis. This has implied tariffs somewhat higher than in neighboring countries, reflecting the higher risks that private investors face in Burundi's power sector. To-date, there is one IPP operating a gas-fired plant of 30 MW in Bujumbura, and a contract with Gigawatt for 7.5 MW solar PV-based production has been signed. The PV plant is currently under construction.
11. **REGIDESO serves only about 76,000 customers, mainly in the capital.** Currently, close to two-thirds (64 percent) of REGIDESO's consumer base are in the capital city, Bujumbura. The rest of the country remains largely unserved. During the 1993–2006 civil war, the electricity access rate in areas connected to the grid halved as the urban population doubled, and the number of customers of the state-owned utility REGIDESO decreased due to damage of the distribution system. Insufficient energy supply is undermining economic growth opportunities for small to large businesses. The imbalance between supply and demand resulted in rolling blackouts in 2015 and 2016 and service interruptions.¹² The annual supply shedding was estimated at 15 GWh, about 5 percent of the total electricity production each year. Preliminary studies also estimate that in 2017 there was a shortage of almost 29 GWh. Firms experience 16.6 electrical outages in a typical month.¹³ Supply shortages and high electricity prices limit commercial opportunities for small-scale farmers, and small to large businesses. For this reason, many large industrial customers rely on expensive alternative

¹² Plan Directeur de Production et de Transport de l'Énergie Électrique au Burundi. Tractebel. (2018). Rapport final - Tome 2: Volume 1 - Préviation de la demande. Page 21.

¹³ The Enterprise Survey shows that firms in Burundi experience 16.6 electrical outages in a typical month, compared to 8.6 in Sub Saharan Africa, and 12 percent in low-income countries. Similarly, 64.2 percent of the firms surveyed in Burundi own or share a generator, compared to 52.8 in Sub-Saharan Africa and 34.0 in low-income countries.



production sources such as privately-owned diesel backup generators to compensate for the frequent load-shedding, unreliable grid supply and high prices. 64.2 percent of the firms surveyed in Burundi own or share a generator. The cumulative capacity of individual diesel generators is unknown at this point.

12. The energy sector in Burundi faces multitude of challenges.

13. **First, access to electricity remains extremely limited, particularly in rural areas.** Reliable data on energy access is not available and consequently, access estimates differ. The 2017 Burundi Rapid Household Survey (ECVMB 2017) reports that 7.5 percent of the population has access to electricity. While 72.5 percent of the population living in Bujumbura and 42.6 percent of the population living in other urban centers have access to electricity, the proportion falls to 1.8 percent of the population in rural areas.¹⁴ Access expansion is constrained by insufficient electricity supply and unreliable transmission and distribution infrastructure resulting from prolonged conflict. Those who have access to electricity, consume little and face unreliable service. As of 2003, 48.4 percent of electricity was consumed by households and 19.9 percent by businesses. Burundi's average per capita consumption of electricity, at 23 kilowatt hour/year (kWh/year), is among the lowest in Sub Saharan Africa where the regional average is 480 kWh/year.^{15,16} Outages are frequent due to various reasons: insufficient supply, related to lack of investment in new generation capacity along with inadequate maintenance of the existing plants, excessive reliance on hydropower (affecting supply during droughts), high technical and commercial losses and operational failures.

14. **Second, the dependence on biomass is overwhelming with significant implications for deforestation and environment.** Biomass represents 95 percent of primary energy consumption, while electricity only accounts for 1.3 percent and oil 2.5 percent. An estimated 98 percent of the population, in urban and rural areas, uses wood or wood-fuel as the main source for heating and cooking. Cooking happens indoor for 92 percent of the population (96 percent for rural and 60 percent for urban). Most households cooking with wood or residues use 3-stones (e.g. the rural ones) while those using charcoal (urban) use metal or metal-ceramic combination stoves that exist in several forms but have limited combustion efficiency. This situation results in (i) significant natural capital depletion, estimated at 29% of GDP per capita in 2010 and largely due to a net depletion of forests¹⁷, and (ii) dire health costs for families (especially the youngest members of families) due to respiratory illness related to indoor air pollution.

15. **Third, growing demand is forcing the sector to rely on expensive emergency rental power.** Peak demand is expected to grow to 89 MW in 2020 and 249 MW in 2030.¹⁸ Energy demand is estimated to grow 50 percent by 2020, from currently 288 GWh (2017 estimated figures); and reach a high of 1,287 GWh by 2030.¹⁹ In response to this anticipated demand growth, the GoB developed a pipeline of new generation projects, including three hydro power projects²⁰. However, these projects are not expected to come online

¹⁴ Subjective Poverty and recent Changes in Living Conditions: Findings from the Rapid Household Survey (2017), World Bank, June 2018.

¹⁵ Implementation Completion and Results Report on a Global Environment Facility Grant to the Republic of Burundi. World Bank, June 2016.

¹⁶ World Development Indicators. Electric power consumption (kWh per capita), 2016, <https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC>

¹⁷ Burundi Poverty Assessment, World Bank 2016 – page 153-154

¹⁸ Plan Directeur de Production et de Transport de l'Énergie Électrique au Burundi. Tractebel. (2017). Page 56. Table 11.

¹⁹ Plan Directeur de Production et de Transport de l'Énergie Électrique au Burundi. Tractebel. (2017). Page 36. Table 8.

²⁰ The three hydro power projects are: 31.5 MW Jiji, 16.5 MW Mulembwe (both supported by World Bank Project P133610), and 80 MW Regional Rusumo Falls (Burundi, Rwanda, and Tanzania). Financing of these projects is supported by the World Bank, African Development Bank (AfDB), European Investment Bank (EIB), and other bilateral agencies. However, the Regional Rusumo Falls hydro project is not expected to come online before 2021, and Jiji and Mulembwe not before 2023. [These delays have led to a need for deployment of] a new 30 MW thermal plant (using heavy fuel oil), which takes less time to be installed, and is now expected to come online in 2019.



before 2021, if not later. In the meantime, REGIDESO generation capacity is supplemented by 10 MW of expensive diesel capacity, rented as backup power to narrow the supply-demand gap during peak hours. The REGIDESO supplied diesel emergency power generation costs between 0.30 US\$/kWh and 0.39 US\$/kWh. For example, in 2016 a tenth of the electricity supplied came from backup generators and 33 percent was imported.²¹

16. **Fourth, the sector faces growing financial, technical and managerial issues.** While REGIDESO has been operating with a net profit in recent years (2014-2016), the utility faces several challenges to its sustainability. Tariffs for electricity and water have in the past not been cost reflective, requiring external financial support. To move the electricity and water sector to cost-reflective tariff levels, the tariffs for both sectors were increased in August 2017²², leading to an expectation of improved financial performance for REGIDESO in 2017. Moreover, the utility's total system losses (technical and non-technical) for the past 5 years were 23.3 percent on average, which had been on a rising trend at 28.8 percent in 2015 and 32.1 percent in 2016. Under the Jiji Mulembwe Project (P133610, financed by the International Development Association, the European Commission, the European Investment Bank (EIB) and the African Development Bank (AfDB)), REGIDESO will carry out a performance improvement program to help address performance issues, which includes, among others, a revenue protection program targeted at the largest clients and the installation of new customer and technical services systems.
17. **Fifth, expanding the grid beyond urban/peri urban areas to increase access will require resources and time.** The recently finalized power sector masterplan estimated investment needs of US\$661 million in the next 5 years to reach the Government's goal of 30% of electricity access in the country by 2030. To-date, the government has not been able to mobilize funds and development partners are unwilling to commit funds to grid extension. Given the limited financing available and the weak financial performance of REGIDESO, Government's priority is to densify the existing network in urban and peri urban centers. Pre-feasibility studies for the densification of Bujumbura are currently under preparation with funding from the Jiji Mulembwe project. In order to expand access in rural areas, alternative service delivery mechanisms are needed to provide services to customers in off-grid areas, either as temporary solutions until the arrival of the grid or as a permanent solution.
18. **Reaching health and education facilities, enterprises, and households with energy services is vital to economic and social development in rural Burundi.** While Burundi is one of the poorest countries in the world, it is also one of the most unequal countries in the region with large spatial disparities across geographic areas and higher poverty rates in rural areas and the Center East region. The rural-urban welfare gap appears to be driven by disparities in households' endowments in assets and education, while important disparities in access to basic services and infrastructure were the main drivers of inequality between regions.²³ As such, the 2018 Systematic Country Diagnostic (SCD) identified increasing access to modern

²¹ Figures from year 2016, from "Rapport Plan Directeur Burundi," prepared by Tractabel. No latest

²² Electricity tariffs for residential consumers moved from a range of 3.8-15.0 US\$/kWh to 4.7 US\$/kWh for those consuming less than 50 kWh/month, 16.5 US\$/kWh for those consuming between 51 and 150 kWh/month, and 31.1 US\$/kWh for those consuming above 150 kWh/month. For commercial consumers tariffs are 11.1 US\$/kWh for those consuming less than 100 kWh/month, 17.9 US\$/kWh for those consuming between 101 and 250 kWh/month, and 22.7 US\$/kWh for those consuming above 250 kWh/month.

²³ Burundi Poverty Assessment, World Bank, June 2016, https://consultations.worldbank.org/Data/hub/files/consultation-template/public-consultations-inform-world-bank-systematic-country-diagnostic-economic-and-social-situation/related/burundi_poverty_assessment_2016-2017.pdf



infrastructure, specifically in the energy sector, as a priority for Burundi. Providing energy access to clinics, schools, businesses and households will improve opportunities and the provision of basic services, thereby improving welfare, catalyzing growth, and dramatically changing livelihoods in rural areas.

19. **Mini-grids are considered an important element of the efforts to provide access to modern energy in rural areas.** The overall potential is yet to be determined in detail²⁴ but current actions of the GoB indicate a growing interest in the application of mini-grids for locations that are not expected to be connected to the national grid in the short and mid-term. The Electricity Law of 2015 prescribes simplified authorization procedures (“simple régime de déclaration”) for mini-grids with capacities up to 500 kW, creating options for light-handed regulations of private sector led mini-grid operations. The initial assessment shows that, despite the small size of the country, there exist sufficient potential locations that will not be connected to the national grid anytime soon and are well suited for electrification through mini-grids, and both public and private sectors seem to be ready to develop the sector based on respective PPP models.
20. **Stand-alone solar market in Burundi is estimated to be around 2 million households²⁵.** Prior to 2015, solar lanterns slowly started to emerge as an alternative in rural areas, but most of the lanterns sold on the market are of low quality, delivering poor service, and breaking frequently. Still, the relatively good (perceived) penetration of solar lanterns in Burundi shows that the Burundians are ready to embrace off-grid solar products (if their quality, reliability and durability can be demonstrated). The penetration of larger solar home systems in rural areas remains limited though due to the affordability and quality constraints.²⁶ The installed capacity of solar photovoltaic systems is not properly inventoried. However, in a 2012 presentation from the Ministry of Energy and Mines, the total solar photovoltaic installed capacity was estimated to be of around 150 kWp (kilowatt peak). A Market Assessment of off-grid solar products financed by ESMAP has been launched to provide evidence and further insights into the market.
21. **Prior to the political unrest in 2015, several private companies operated in the stand-alone solar space, as part of an EnDev designed pilot program** to provide solar home systems to teachers, whose solar loan was financed by the MFI FEST. Many of the companies who participated in the program subsequently ceased their solar activities, because operating became too difficult in and after 2015. Private companies, individuals, religious communities and some donor funded hospitals, health centers and schools have solar PV systems. Since 2015, a small number of new companies have been established to sell or lease solar products, but none have achieved large scale.
22. **Development of an off-grid market is currently constrained by five main challenges:** high foreign currency exchange risk, a thriving low-quality products market, affordability issues and price sensitivity of end-consumers, duty and VAT charges, and the dearth of financing for private sector activities. On the supply side, the shortage of foreign reserves seriously constrains imports of renewable energy products and stove parts, which are for the most part manufactured in China and Europe. In addition, solar off-grid companies are not able currently to secure working capital loans nor to secure the foreign currency needed to place orders of these products overseas, and they do not have access to financing from foreign Banks. On the

²⁴ The ESMAP-funded GIS study that is currently ongoing aims to identify potential mini-grid locations and generate indicative costs of mini-grid development.

²⁵ Based on the following assumptions: 88 percent of population living in rural areas; 1.8% electrification rate; 4.8 people per household.

²⁶ The exact penetration of SHS in Burundi is not known, but most of the market concentrates on better-off urban households who buy SHS as a back-up to the unreliable grid.



demand side, upfront payment for SHS is high for low income households, especially for larger systems. Combined with VAT, taxes on RE products are reported to amount to up to 25 percent of the price of products. Finally, consumers lack confidence in off-grid RE products due to the plethora of low-quality products in the market and lack of after sale services.

23. Underpinned by a geospatial analysis that determines least-cost electricity supply solutions throughout the country, the proposed project will support human capital development and household access expansion in rural Burundi by (a) leveraging innovative business models for the deployment of mini-grids and large component-based systems for community facilities, (b) testing an approach to provide vulnerable households with access to energy services, and (c) using market-based incentives to reduce the barriers to access to solar systems and clean cooking solutions in rural and remote areas.
24. **World Bank has focused its support to bringing the energy sector into a sustainable position.** The Bank is supporting the GoB through several interventions, including the ongoing Jiji and Mulembwe Hydropower project (P133610), co-financed by the European Union (EU), the African Development Bank (AfDB) and the European Investment Bank. The project aims to increase the supply of clean and low-cost hydropower electricity to Burundi's national grid. The Bank is also co-financing the Rusumo Falls project with the EU and AfDB. Under Sustainable Energy for All, the World Bank also financed the preparation of a distribution masterplan for the energy sector, with the African Development Bank (AfDB) financing the generation and transmission plan. Moreover, the World Bank has been engaged with the GoB to continue improving its enabling environment for competitive procurement of private sector investment in renewable energy generation infrastructure. To this end, the World Bank is working with the Public-Private Infrastructure Advisory Facility (PPIAF) to support AREEM and the MHEM in the development of a complete, functioning regulatory framework. The Energy Sector Management Assistance Program (ESMAP) has recently approved funding for studies on off-grid access expansion. The proposed project would help improve renewable energy access through off-grid electrification. It will test the ground for new off-grid technology, increase private sector engagement and contribute to building up investors' confidence.
25. **There is increased donors' interest in supporting off-grid access expansion.** Most of current donors' funding supports grid connected generation projects (Jiji Mulembwe and Rusumo Falls projects). However, there is renewed interest in off-grid access. The European Union will soon launch a call for proposals for the provision of energy services to rural communities. It is also contemplating a US\$11mn investment from ELECTRIFI to support private investments in off-grid access (household systems and mini grids). EnDev is also exploring investments in solar products for small services and agriculture activities and clean cooking products. See Annex 3 for more details.

Relationship to CPF

26. **The development of electricity generation infrastructure and off-grid renewable energy solutions represents a key component of the GoB's strategy to support economic and human capital development.** The Project is fully aligned with the second objective of the National Development Plan to ensure "sustainable and inclusive growth for economic resilience and sustainable development", under the second pillar that seeks to promote alternative sources of energy. It will also contribute to the Plan's focus on developing rural areas. The project is fully consistent with the WBG's FY19-23 Country Partnership



Framework (CPF) for Burundi. The CPF has two focus areas: first, improving human capital and promoting social inclusions; and second, strengthening foundations for economic and social resilience. In support of the second focus, the WBG identified the following objective related to the power sector: Increasing access to energy for poor families (Objective 2.2). Furthermore, the CPF recognizes that making gains in the energy sector is critical for growth and livelihoods, and particularly for improving services and opportunities in rural areas. The CPF has set targets to double electricity generation capacity from 51MW to 105 MW and increase the number of community social centers provided with access to electricity through off-grid systems from zero to 1,080 schools and 150 clinics in 2023. The proposed project would contribute to achieving both targets by (i) the increasing renewable energy generation capacity in the country, through the development of mini-grids, and (ii) scaling up off-grid renewable energy solutions in rural areas.

27. **The proposed project is consistent with MFD agenda.** The project will use limited public resources to mobilize private sector investments in rural Burundi to promote development, access to electricity, and contribute to the twin goals of increasing shared prosperity and ending poverty. As the first Off-Grid Access project in Burundi, the proposed project would support establishment of an enabling framework and pilot mechanisms to de-risk private sector participation in rural energy in a Fragile, Conflict and Violence (FCV) context, through dissemination of modern energy products and construction of energy infrastructure, namely mini-grids and PV systems.

C. Proposed Development Objective(s)

Expand access to energy services for Burundian households, businesses and public institutions in rural areas.

Key Results (From PCN)

28. The following indicators would be measured:

- Generation Capacity of Renewable Energy constructed or rehabilitated under the project (MW)
- People provided with access to energy under the project by household connections/- Renewable Energy – Off-grid (#)
- Community electricity connections under the project - Renewable Energy – Off-grid (#)
- *Direct beneficiaries* (#)

D. Concept Description

29. The proposed project would be articulated around four components: (i) Stand-alone solar systems for health and education facilities (ii) Mini-grids for communities (iii) Stand-alone solar systems and efficient cookstoves for households (iv) Technical assistance and capacity building.

Component 1: Stand-alone solar systems for health and education facilities



30. The component will support the rollout of Stand-alone Solar Systems to health centers and schools, including adjacent dormitories, teachers' and nurses' homes. The component aims at achieving educational and service provision benefits of school and health center electrification, as evidenced by numerous studies. The possibility of providing cookstoves for schools, expanding an existing program financed by the World Food Program, and electrifying nearby communities will also be explored. The GIS study is currently mapping unelectrified schools and health clinics in the country. Institutions that are situated in remote areas without access to grid electricity will be prioritized.

Component 2: Mini grids for communities

31. This component will finance the implementation of pilot mini-grids to kick-start the development of a private sector led mini-grid market in Burundi. Mini-grids contribute to leveraging productive activities (especially agriculture/artisanal production etc.) in areas that will not be reached by the grid in the medium to long term, offering a viable opportunity for economic development. Thus, building upon ABER's experience in operating such systems, mini and micro-hydro based mini-grids or hybrid mini-grids²⁷ with combined power generation from solar PV, diesel generators and battery storage will be implemented in selected locations.

Component 3: Stand-alone solar systems and efficient cookstoves for households

32. This component will address constraints to accelerating growth of the off-grid solar market and leverage mechanisms that will be put in place to ease the access to foreign currency, access to finance for households and businesses, improve affordability of solar electricity services, and encourage productive use of electricity. This component will also support the electricity and cooking needs of the most vulnerable households in Burundi, as identified under the Merankabandi project.

Component 4: Technical Assistance, Capacity Building and Project Implementation Support

33. This component will assist public and private sector stakeholders - Ministry of Energy, ABER, AREEN, off-grid companies, micro finance institutions, etc. - in building technical expertise and operational capacity, devise enabling policies and regulatory frameworks to expand off-grid access. It will provide a broad range of technical and financial support in access planning, implementation support, and capacity-building activities.

²⁷ Potential mini-grid sites were visited during a recent mission. It was assessed that the average mini-grid could have the following specifications: Hybrid systems with combined power generation capacity from solar PV (average capacity of approx. 200 kWp per system); diesel generators (average capacity of approx. 50 kVA per system); battery storage (average capacity of approx. 500 kWh per system); and low voltage distribution networks (total length up to 10 km per system). The relevance of this model will be assessed further during project preparation.



| Legal Operational Policies | Triggered? |
|---|------------|
| Projects on International Waterways OP 7.50 | No |
| Projects in Disputed Areas OP 7.60 | No |

Summary of Screening of Environmental and Social Risks and Impacts

The Environmental and Social Risk Classification of the project is substantial due to: (i) the expected low institutional capacity of the PIU, ABER, MHEM and OBPE on the ESF; (ii) impacts and risks associated with hybrid systems that combine power generation capacity from solar PV and diesel backup with battery storage as well as the construction of low voltage distribution networks; (iii) impacts on biodiversity and natural resources on construction sites; (iv) the production of noise, water and air pollution (GHG emissions); (v) small-scale involuntary land acquisition and related impacts, (vi) limited exposure of GBV risks to school-age children and vulnerable community members, (vii) barriers to access to project benefits for women and vulnerable populations including Batwa; and (viii) risks of inequity in the identification of sub-project sites. The establishment of a results-based financing (RBF) facility and a debt facility to solar off-grid companies that will be subject to the requirements of ESS9, and the need to develop and maintain effective environmental and social systems of beneficiary solar off-grid companies adds to the complexity of the social and environmental risks assessment and mitigation measures.

Note To view the Environmental and Social Risks and Impacts, please refer to the Concept Stage ESRS Document.

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